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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/574,687

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EXAMINER

KIM, TAEYOON

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/574,687	<b>Applicant(s)</b> MORITA ET AL.	
	<b>Examiner</b> TAEYOON KIM	<b>Art Unit</b> 1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 10-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

Claims 1-18 are pending.

#### ***Response to Amendment***

Applicant's amendment and response filed on 10/30/2008 has been received and entered into the case.

Claims 10-17 have been withdrawn from consideration as being drawn to non-elected subject matter, claim 18 is newly added, and claims 1-9 and 18 have been considered on the merits. All arguments have been fully considered.

The claim rejection under 35 U.S.C. § 112, 2<sup>nd</sup> para., has been withdrawn due to the amendment.

The claim rejections under 35 U.S.C. § 102 based on Nelles et al. have been withdrawn due to the amendment.

#### ***Response to Arguments***

In the response to the claim rejection under 35 U.S.C. § 103 based on Nelles et al. in view of Kobayashi et al. and Georger et al., applicant argued that the references do not teach or suggest the removal of cells during the transfer step without enzymatic degradation or lowering temperature. This is correct in part. Since as applicant argued, Nelles et al. utilize enzymatic degradation or lowering temperature to release cells adhered on the matrix forming patterns on a substrate. However, in combination with Kobayashi et al.'s teaching which utilizes different materials for patterning from Nelles et al., the method step of releasing cells from the substrate should be adjusted or altered. The enzymatic degradation taught by Nelles et al. is based on the use of collagen or

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fibrin-gel as cell adhesion molecules. However, the teaching of Kobayashi et al. and Georger et al. do not utilize such peptide link/bonding which would require enzymatic dissociation or lowering temperature. Different from these cell adhesion materials, siloxane used by Kobayashi et al. and Georger et al. would not require such treatment because of the hydrophilic interaction between cells and the siloxane/silane materials used for cell adhesion promoters. Furthermore, Haddow et al. teach that cells (e.g. keratinocytes) attached to various different substrates can be transferred to another substrate including organ/tissue (e.g. DED from a split thickness skin graft; dermis) without further treatment on the initial substrate such as enzymatic dissociation or lowering temperature (p.21-22). Therefore, it would have been obvious to a person of ordinary skill in the art to directly contact the cells on patterned substrate with the organ/tissue (a second substrate) as an artificial organ/tissue or implant. Therefore, the rejection is maintained.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-9 and 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The newly introduced limitation of “without lowering temperature” in claim 1 and its dependent claims does not have a proper support from the specification, and thus is considered as a new matter.

M.P.E.P. §2173.05(i) states that any negative limitation or exclusionary proviso must have basis in the original disclosure. If alternative elements are positively recited in the specification, they may be explicitly excluded in the claims. See *In re Johnson*, 558 F.2d 1008, 1019, 194 USPQ 187, 196 (CCPA 1977) (“[the] specification, having described the whole, necessarily described the part remaining.”). See also *Ex parte Grasselli*, 231 USPQ 393 (Bd. App. 1983), *aff’d mem.*, 738 F.2d 453 (Fed. Cir. 1984). The mere absence of a positive recitation is not basis for an exclusion. Any claim containing a negative limitation which does not have basis in the original disclosure should be rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Note that a lack of literal basis in the specification for a negative limitation may not be sufficient to establish a *prima facie* case for lack of descriptive support. *Ex parte Parks*, 30 USPQ2d 1234, 1236 (Bd. Pat. App. & Inter. 1993). See MPEP § 2163 - § 2163.07(b) for a discussion of the written description requirement of 35 U.S.C. 112, first paragraph.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 1-9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelles et al. (of the record) in view of Kobayashi et al. (of the record) and Georger et al. (of the record) in further view of Haddow et al. (WO 2003/035850) and Ostuni et al. (US 6,893,850).

Nelles et al. teach a method of growing cells on a surface having a pattern of cell-growth promoting molecules and/or cell-growth inhibiting molecules attached thereon (para. 10).

Nelles et al. also teach a transfer step to transfer cells on cell-growth promoting surface to another substrate by contacting the pattern of cells with the second surface (para. 19-28). Nelles et al. also teach that the pattern of cells used in one device can be transferred into sterile condition and then be returned to the incubator for a further period of culture (par. 52). Nelles et al. teach the second surface can be tissues, implants or transplants, thus a biomaterial (par. 31). The pattern of Nelles et al. includes linear regions (see Table 1).

Nelles et al. do not teach that the cell adhesiveness variation material being varied by the action of a photocatalyst along with energy irradiation.

Kobayashi et al. teach a substrate having a layer comprising a photocatalyst and a material having varying wettability through the action of photocatalyst upon pattern-wise exposure to light (see abstract and Figure 1).

It would therefore have been obvious for the person of ordinary skill in the art at the time the invention was made to replace the substrate of Nelles et al. with the substrate of Kobayashi et al.

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The skilled artisan would have been motivated to make such a modification because it is well known in the art to utilize photolithography for forming a high definition pattern and the pattern-formed substrate has been utilized for cell culture according to Georger et al. (abstract). Furthermore, the material utilized by Kobayashi et al. is organopolysiloxane prepared from a composition containing silane, which is the same material of Georger et al. (silane film) utilized for cell adhesion. Still further, Nelles et al. teach that other techniques for attaching and patterning biomolecules including siloxane (par. 6). Therefore, a person of ordinary skill in the art would recognize that the wettability varying layer of siloxane/silane substrate of Kobayashi et al. is suitable alternative for cell adhesiveness and patterning purpose to replace the cell growth promoting surface of Nelles et al.

M.P.E.P. §2144.07 states "The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) (Claims to a printing ink comprising a solvent having the vapor pressure characteristics of butyl carbitol so that the ink would not dry at room temperature but would dry quickly upon heating were held invalid over a reference teaching a printing ink made with a different solvent that was nonvolatile at room temperature but highly volatile when heated in view of an article which taught the desired boiling point and vapor pressure characteristics of a solvent for printing inks and a catalog teaching the boiling point and vapor pressure characteristics of butyl carbitol. "Reading a list and selecting a known compound to meet known requirements is no more ingenious than selecting the last

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piece to put in the last opening in a jig-saw puzzle.” 325 U.S. at 335, 65 USPQ at 301.)”.

Kobayashi et al. also teach that the surface having high critical surface tension would have the wettability in terms of contact angle with water being not more than 40° (col. 28, lines 23-27).

With regard to the limitation drawn to the transferring step comprising removing cells without enzymatic degradation or lowering temperature, Nelles et al. teach that enzymatic degradation or lowering temperature would be preferable method for releasing cells from the substrate. However, it would have been obvious to a person of ordinary skill in the art to modify this method step in view of the combined teaching of Kobayashi et al. using siloxane different from the cell adhesive materials used in the method of Nelles et al. This is because the materials of Nelles et al. require enzymatic degradation or lowering temperature is different from the materials used for cell patterning in the method of Kobayashi et al., and enzymatic degradation or lowering temperature is not required. Furthermore, Haddow et al. teach direct contact of cells on a patterned substrate to another including tissue or organ. Thus, a person of ordinary skill in the art would have a motivation to transfer cells on the patterning substrate to another target by directly applying or contacting the cell patterned substrate, and subsequently cells on the patterned substrate would be transferred to the second substrate (tissue or organ).

With regard to the limitation in claim 9 of the widths and the distance (space widths between lines), the specific sizes of each line formed on the substrate and the distance between such lines are considered to be result-effective variables. Because



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Georger et al. teach the use of endothelial cells and the patterning would be achieved by coating with at least one region of cell adhesion promoter with a width which corresponds to the desired outer circumference of the microvessel (col. 9, lines 56-63). Furthermore, Ostuni et al. teach that the width of cell adhesive region and the space between would be 3-500  $\mu\text{m}$  (Fig. 2a), overlapping with the claimed range of width.

Therefore, the arrangement of the regions having cell adhesiveness and the regions cell non-adhesiveness would be optimized based on the desired purpose of the cell patterning device. The variables would be routinely optimized by one of ordinary skill in the art in practicing the invention disclosed by those references. Generally, differences in sizes and distances will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 CCPA 1955) (Claimed process which was performed at a temperature between 40°C and 80°C and an acid concentration between 25% and 70% was held to be prima facie obvious over a reference process which differed from the claims only in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%.); >see also Peterson, 315 F.3d at 1330, 65 USPQ2d at 1382 ("The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."); \*\* In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969) (Claimed elastomeric

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polyurethanes which fell within the broad scope of the :references were held to be unpatentable thereover because, among other reasons, there was no evidence of the criticality of the claimed ranges of molecular weight or molar proportions.). For more recent cases applying this principle, see *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). Accordingly, the claimed invention was prima facie obvious to one of ordinary skill in the art at the time the invention was made especially in the absence of evidence to the contrary.

With regard to the cell type adhered on the patterned substrate being vascular endothelial cells, as discussed above, Georger et al. teach the cells being endothelial cells forming microvessel (thus, vascular endothelial cells) (col. 9, lines 56+63).

With regard to the limitation of claim 18 drawn to two or more types of cells and the cell adhesiveness variation pattern, Nelles et al. in view of Kobayashi et al. and Georger et al. in further view of Haddow et al. do not particularly teach the limitation.

However, it would have been obvious for the person of ordinary skill in the art at the time the invention was made to try multiple cells and cell adhesiveness patterns in the method of Nelles et al. in view of Kobayashi et al. and Georger et al.

The skilled artisan would have been motivated to make such a modification because Ostuni et al. teach the patterning of multiple cell types (col.3, lines 49-52; col. 9, lines 24-31; col.10, lines 54-64). Since the method of Nelles et al. in view of Kobayashi et al. and Georger et al. is capable of culturing two or more cell types as

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Ostuni et al., a person of ordinary skill in the art would try to culture two or more cells on the patterned substrate of Nelles et al. in view of Kobayashi et al. and Georger et al. with reasonable expectation of success.

Therefore, the invention as a whole would have been prima facie obvious to a person of ordinary skill at the time the invention was made.

### ***Conclusion***

No claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TAEYOON KIM whose telephone number is (571)272-9041. The examiner can normally be reached on 8:00 am - 4:00 pm ET (Mon-Thu).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon B Lankford/  
Primary Examiner, Art Unit 1651

Taeyoon Kim  
AU-1651